Siganus luridus **System:** Marine

Kingdom	Phylum	Class	Order	Family
Animalia	Chordata	Actinopterygii	Perciformes	Siganidae

Common name

Synonym

Similar species

Summary

S. luridus is an herbivorous fish native to the western Indian Ocean and the Red Sea (Daniel et al., 2009). Since 1956 it has been present and often has become invasive in areas of the Mediterranean Sea, as a result of the opening of the Suez Canal. (Azzurro et al., 2017). It's invasiveness stems from an ability to compete with native fish species such as the Sarpa salpa (Bariche et al., 2004), and the alteration of benthic communities to "barrens" (Sala et al., 2011).

view this species on IUCN Red List

Species Description

Dark-brown to olive coloration, with variable yellow hints on the fins. Commonly 20cm long, with a maximum recored length of 30cm. Has a compressed, ellipsoid body with a midline of the thorax lacking scales between the pelvic ridges. It has a dorsal fin originating above the pectoral fin base, a slightly concave head with a blunt snout, a small mouth with distinct lips, and incisor teeth found in a single row. The anal fin has a rounded margin and the caudal fin is truncated. Its anterior nostril has a long, broad flap that covers the posterior nostril when depressed. It has 7 anal spines and 13-14 dorsal spines, with the inner spine of the pelvic fin connected by a membrane to the abdomen. These are venemous, and may suddenly be presented to potential predators as the fish stops and erects the dorsal and pelvic fins. The anterior spines of the median fins are slender and sharp, while the posterior ones are stout. (FISHBASE) (Poloniato et al., 2010).

Notes

Part of a group of species that entered the Mediterranean through the Suez Canal and proceeded to establish throughout much of the area, often becoming invasive. This phenomenon is known as the Lessepsian migration (Stamouli et al., 2017). The severity of this migration has been highlighted by the fact that almost half of the catch of trawl fisheries in Israel consist of Lessepsian migrant species (Golani, 1998) It's not certain if they crossed the canal by natural means, or as stowaways in ship-ballast waters. It's large home ranges have also suggested that secondary introductions throughout the Mediterranean may be a result of natural spread through currents, which could facilitate the movement of larvae (Daniel et al., 2009). S. luridus also presents an interesting case of interactions between invasive species. C. racemose is also a growing invasive in Mediterranean coasts. This species is part of the fish's diet, which may reflect a possible facilitation for the establishment of S. luridus populations (Azzurro et al., 2007). Expected rises in the salinity and temperature of Mediterranean waters may have a number of strengthening effects on the invasiveness and spread of the species. Increased temperatures may strengthen trends of early spawning (Giakumi, 2014) and the westward spread of the species (Evans et al., 2015). This may increase its competitive ability with the native Sarpa salpa, pottentially affecting this species in the future (Giakumi, 2014). Juveniles are preyed upon by carnivores such as Synodus variegatus, Fistularia spp. and larger goatfish (Mullidae) (Shakman, 2008).

Lifecycle Stages
Larvae are pelagic, remaining near the water surface, and begin feeding on phytoplankton and zooplankton after three days of hatching. The larval stage duration is suggested to be 30 days (Bariche et al., 2004). Juveniles and adults live in littoral and sublittoral zones. The maximum recorded lifespan for this species is six years (Bariche, 2005), and they reach sexual maturity within a year (Marietta, 1998). (Woodland, 1983; FISHBASE).

Uses
Commercial use in fisheries. (Herzberg, 1973) (FISHBASE)(Corsini-Foka, 2017).

Habitat Description
Prefers hard, rocky bottoms or coral debris covered with some vegetation. Adults are usually solitary or in groups of 3 to 4 members, but very large schools of adults can sometimes be found in the Mediterranean. Can also be found in small schools in very shallow water close to the bottom. Its diet restricts it to littoral and sublittoral zones, with a depth range of 2-40m. It has high tolerance to varying levels of salinity. (FISHBASE) (Marietta, 1998) (Otero et al., 2013) (Woodland, 1983)

Reproduction
Sexual, with external fertilization. They don’t exhibit guarding behavior nor parental care. They are described as substratum egg scatterers and are a group-synchronous spawner (FISHBASE). A study in the Mediterranean Sea found that they can potentially release 1500 eggs per gram of S. luridus (Bariche et al., 2009). Their spawning season starts in March and can extend until August (Popper et al., 1978; Öksüz et al. 2010), although high temperatures have also been reported to limit its gonadal development, reducing the length of the breeding season (Bariche et al., 2003).

Nutrition
This herbivorous fish feeds on benthic algae and sea grass. Preferentially feeds on coarse brown algae (Azzurro et al., 2007). Studies on gut contents have found up to 35 different taxa of these, including green algae such as Ulva, Cladophora and Enteromorpha (Sabour & Lakkis, 2007), showing the broad diet of the species. They are also capable of modifying their diet severely to adapt to new environment, contributing to their ease in establishment in alien ranges (Bariche, 2006). They feed continuously, even during the reproduction and spawning periods (Sabour & Lakkis, 2007). The larval and immediate post larval stages are planktivorous (Woodland, 1983).

General Impacts
This species is generally regarded as a pottential invasive species throughout Mediterranean systems because of its ability to severly modify benthic communities. Heavy grazing has been shown to decrease the biomass of benthic comunities, generating “barrens” with lowered primary productivity and hence eliminating habitats and biodiversity (Sala et al., 2011). Some of these habitats are important nurseries for littoral fish species (Otero et al., 2013). They are also capable of competing with the native herbivores of the Mediterranean, such as Sarpa salpa (Bariche et al., 2004). Lack of data from before the opening of the Suez Canal has made it difficult to show these ecological changes in a quantitative way (Ben Tuvia, 1973). This fish is also a socio-economic hazard. There have been multiple reported cases of Ciguatera posioning after consumption of S. luridus (Herzberg, 1973). The venemous spines are not lethal to humans but can inflic severe pain (FISHBASE; Streftaris & Zenetos, 2006). Competition with native species may also reduce commercial stocks, affecting fisheries (Katsanevakis et al., 2014). The modification of benthic communities can also have negative impacts on tourism activities such as SCUBA diving, snorkeling and recreational fishing (Katsanevakis et al., 2014). Bellwood and Goatley predict that S. luridus could pottentially cross the Atlantic and become established in the Caribbean. While they don’t advocate introduction, they suggest that this could result in a means of biocontrol against the overgrowth of algae in reefs due to the fish’s broad diet and adaptability. They also speculate that S. luridus would be less naive and hence more resistant to Lionfish predation because of their high densities in their native ranges (Bellwood & Goatley, 2017).

Management Info
No active management programs exist for preventing further spread, eradicating existing alien colonization, nor controlling them. Monitoring programs with numerous volunteers in Malta and Greece have successfully been able to identify S. luridus during their surveys. (Zenetos et al., 2013; Otero et al., 2013).

Pathway
First reported off the coast of Israel (Schembri et al., 2012). Dispersal through the corridor is certain but whether it was unaided or through ship ballast is not reported.

Principal source: (Monitoring Marine Invasive Species in Mediterranean Marine Protected Areas (MPAs) A strategy and practical guide for managers) (Sala et al., 2011) (Evans et al., 2015) (Daniel et al., 2009) (Azzurro et al., 2017) (Bariche et al., 2004) (Bariche et al., 2009) (FISHBSE) (Woodland, 1983) (Poloniato et al., 2010)

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ALIEN RANGE

[1] CROATIA
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[1] LIBYAN ARAB JAMAHIRIYA
[1] MEDITERRANEAN & BLACK SEA
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[1] ISRAEL
[1] LEBANON
[1] MALTA
[1] MONTENEGRO
[1] TURKEY

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